ABSTRACT

An efficient logging method and system is disclosed that can be used to recover from a failure in a transaction system. It is based on a differential logging scheme that allows commutative and associative recovery operations. The method includes the steps of taking a before-image of the primary database in main memory before an update to the primary database; taking an after-image of the primary database after the update; generating a differential log by applying bit-wise exclusive-OR (XOR) between the before-image and the after-image; and performing either a redo or undo operation by applying XOR between said one or more logs and the before-image. Since XOR operations are commutative and associative, correct recovery is possible regardless of the creation sequence of log records. The present invention improves the performance of a logging system by reducing the size of log records and by allowing parallel execution of recovery operations.